

# Use of CytoSorb in Streptococcus pneumoniae Sepsis

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This case study reports on a 69-year-old patient (pre-existing medical history: lung carcinoma with upper and lower right lobe resection one year before), admitted to hospital via emergency transport with fever, respiratory insufficiency, hemodynamic instability as well as signs of sepsis.

## Case presentation

- Direct transfer to intensive care unit with non-invasive ventilation
- Intubated and ventilated due to respiratory exhaustion (PaO<sub>2</sub>/FiO<sub>2</sub> ratio of 150)
- High-dose antibiotic therapy with piperacillin/tazobactam and clarithromycin
- The CT showed infiltrates in the right upper lobe and the diagnosis of pneumonia was made
- Subsequently multiple bronchoscopies with detection of Streptococcus pneumoniae (mucoid form)
- Development of severe hemodynamic instability with the need for very high doses of catecholamines (norepinephrine 9.6 mg/h, terlipressin 0.16 mg/h) and maximum volume therapy 1 l/h (15 liters/20 hours)
- The patient had to be resuscitated (1 reanimation cycle) as a result of slight repositioning maneuvers, his circulation could be restored with an infusion of adrenaline however he remained hemodynamically unstable
- Highly elevated inflammatory parameters (CRP 406 mg/l, leukocytes 18 E9/l, PCT 160 ng/ml) as well as severe impairment in renal function (creatinine 4.3 mg/dl, GFR 14 ml/min/m<sup>2</sup>)
- Due to renal failure, metabolic acidosis (pH 7.07, lactate 8 mmol/l) and hemodynamic instability with further increasing norepinephrine doses the decision was made to start renal replacement therapy together with CytoSorb

## Treatment

- Three treatments with CytoSorb for a total treatment period of 50 hours (6 hours, 20 hours, 24 hours)
- CytoSorb was used in conjunction with CRRT (Multifiltrate, Fresenius Medical Care) performed in CWHD mode
- Blood flow rate: 100-150 ml/min
- Anticoagulation: heparin
- CytoSorb adsorber position: pre-hemofilter

## Measurements

- Demand for catecholamines
- Inflammatory parameters (CRP, PCT, leukocytes)
- Metabolic variables (lactate, pH)
- Renal function

### Results

- Hemodynamic stabilization with a significant reduction in catecholamine doses - norepinephrine halved within the first 24 hours and could be consistently reduced in the further course
- Clear reduction in inflammatory parameters (PCT halved from day to day, with 78 ng/ml already after the first 24 hours, CRP from 400 mg/l to 275 mg/l, leukocytes from 18 E9/l to 13 E9/l and later to 10 E9/l)
- Lactate (from 5 to 2 mmol/l) and pH (from 7.0 to 7.3) improved significantly throughout the course of the treatments and normalized
- Improvement in renal function
- Clear improvement in oxygenation index to over 200

### Patient Follow-Up

- In the further course the patient had to be tracheotomized, however he was awake, oriented and able to mobilize
- Patient is still planned for right lobectomy due to suspicion of a persisting infective focus

## CONCLUSIONS

- Rapid hemodynamic stabilization resulting in a reversal of the shock state with otherwise exhausted therapy
- The rapid initiation of treatment in ICU with the combination of appropriate antibiotics, CytoSorb and CVVHD enabled an effective stabilization of the patient's clinical situation
- The installation of the Cytosorb absorber into the CVVHD circuit was simple and safe